WHAT IS CLAIMED IS:

1. A system (10) to forecast the electrical conductivity of an anode (12) for aluminum production before baking, the system (10) being characterized in that it comprises:

an electromagnetic field emitting unit (14,18) to generate an excitation electromagnetic field;

at least one receiving coil (20,22) electromagnetically coupled to the electromagnetic field emitting unit (14,18);

a sensing device (30) connected to the receiving coil (20,22), the sensing device (30) outputting a signal indicative of a variation of the electromagnetic field received by the receiving coil (20,22) as the crude anode (12), or a sample thereof, passes inside the receiving coil (20,22);

a carriage unit (40) to move the crude anode (12), or the sample thereof, at least relative to the receiving coil (20,22); and

means for calculating a value indicative of the electrical conductivity of the anode (12) using at least the signal from the sensing device (30) and signals previously obtained using reference anodes (12).

2. The system (10) as defined in claim 1, characterized in that two opposite receiving coils (20,22) are provided with reference to the electromagnetic field emitting unit (14,18), both receiving coils (20,22) being in serial connection with each other.

3. The system (10) as defined in claim 2, characterized in that the receiving coils (20,22) have oppositely winded coils, both coils having substantially identical characteristics and being coaxially positioned with reference to a main axis (M).

4. The system (10) as defined in claim 3, characterized in that the electromagnetic field emitting unit (14,18) includes an AC generator (18) connected to an emitting coil (14).

5. The system (10) as defined in claim 4, where in the AC generator (18) operates at a frequency between 100 and 10,000 Hertz.

6. The system (10) as defined in claim 4 or 5, characterized in that the emitting coil (14) is substantially coaxial with reference to the main axis (M).

7. The system (10) as defined in claim 4, 5 or 6, characterized in that the receiving coils (20,22) are substantially equidistant with reference to the emitting coil (14).

8. The system (10) as defined in any one of claims 1 to 7, characterized in that the sensing device (30) includes an ammeter.

9. The system (10) as defined in any one of claims 1 to 8, characterized in that the means for calculating a value indicative of the electrical conductivity of the anode (12) include a computer, the computer (32) having a memory (34) in which are recorded the signals previously obtained using the reference anodes (12).

10. A method for forecasting the electrical conductivity of a pre-baked anode (12) for aluminum production before the anode (12) is baked, the method being characterized in that it comprises:

generating an excitation electromagnetic field;

moving the anode (12) at a crude stage, or a sample thereof, within at least one receiving coil (20,22) electromagnetically coupled to the electromagnetic field;

sensing a variation in the electromagnetic field received by the receiving coil (20,22) and outputting a signal indicative thereof; and

calculating a value indicative of the electrical conductivity of the anode (12) using the signal indicative of the variation and previously-recorded signals obtained with reference anodes (12) for which the electrical conductivity has been measured after baking.

11. The method as defined in claim 10, characterized in that it further comprises:

comparing the electrical conductivity of the anode (12) to a threshold value; and

discarding the crude anode (12) before baking based on the fact that its forecasted electrical conductivity is below the threshold value.

12. The method as defined in claim 11, characterized in that it further comprises:

modifying the composition of subsequently-manufactured crude anodes (12) based on the forecasted electrical conductivity of the anode (12) in effort to optimize the electrical conductivity of the subsequently-manufactured anodes (12) after baking.

13. The method as defined in any one of claims 10 to 12, characterized in that value indicative of the electrical conductivity of the anode (12) is calculated using a value indicative a maximum variation in the signal.

14. A method of forecasting the electrical conductivity of a new anode (12) for aluminum production before baking of the anode (12), the method being characterized in that it comprises:

sensing a variation caused by a first reference crude anode (12) to an excitation electromagnetic field received by at least one receiving coil (20,22);

sensing the variation for a plurality of additional reference crude anodes (12) having various compositions;

measuring the electrical conductivity of the reference anodes (12) once baked;

determining a correlation between the sensed variations for the reference anodes (12) before baking and their electrical conductivity measured after baking;

sensing the variation for the new anode (12) at a crude stage; and

calculating a value indicative of the electrical conductivity of the new anode (12) using the correlation between the sensed variations for the reference anodes (12) before baking and their measured electrical conductivity after baking.

15. The method as defined in claim 14, characterized in that it further comprises:

comparing the forecasted electrical conductivity of the new anode (12) to a threshold value; and

discarding the new anode (12) before baking based on the fact that its forecasted electrical conductivity is below the threshold value.

16. The method as defined in claim 14 or 15, characterized in that it further comprises:

modifying the composition of subsequently-manufactured new crude anodes (12) based on the forecasted electrical conductivity of the new anode (12) in effort to meet the electrical conductivity threshold.

17. The method as defined in any one of claims 14 to 16, characterized in that value indicative of the electrical conductivity of the anode (12) is calculated using a value indicative a maximum variation in the signal.